

# Algebra 2 - Matrix Review

Name: Key

Find the inverse of the matrix, if it exists.

1.  $\begin{bmatrix} 4 & 7 \\ 1 & 2 \end{bmatrix}$

$$\frac{1}{8-7} \begin{bmatrix} 2 & -7 \\ -1 & 4 \end{bmatrix} = \begin{bmatrix} 2 & -7 \\ -1 & 4 \end{bmatrix}$$

2.  $\begin{bmatrix} 3 & 2 \\ 4 & 2 \end{bmatrix}$

$$\frac{1}{6-8} \begin{bmatrix} 2 & -2 \\ -4 & 3 \end{bmatrix} = \begin{bmatrix} -1 & 1 \\ 2 & -1.5 \end{bmatrix}$$

3.  $\begin{bmatrix} 4 & -2 \\ 3 & 1 \end{bmatrix}$

$$\frac{1}{4+6} \begin{bmatrix} 1 & 2 \\ -3 & 4 \end{bmatrix} = \begin{bmatrix} 1/10 & 2/10 \\ -3/10 & 4/10 \end{bmatrix} = \begin{bmatrix} 1/10 & 1/5 \\ -3/10 & 2/5 \end{bmatrix}$$

4.  $\begin{bmatrix} 7 & 14 \\ 3 & 6 \end{bmatrix}$

$$\frac{1}{42-42} \rightarrow \text{undefined}$$

no inverse

5.  $\begin{bmatrix} -4 & -2 \\ 5 & 2 \end{bmatrix}$

$$\frac{1}{-8+10} \begin{bmatrix} 2 & 2 \\ -5 & -4 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ -2.5 & -2 \end{bmatrix}$$

6.  $\begin{bmatrix} 3 & -3 \\ -3 & -2 \end{bmatrix}$

$$\frac{1}{-6-9} \begin{bmatrix} -2 & 3 \\ 3 & 3 \end{bmatrix} = \begin{bmatrix} -2/-15 & 3/-15 \\ 3/-15 & 3/-15 \end{bmatrix} = \begin{bmatrix} 2/15 & -1/5 \\ -1/5 & -1/5 \end{bmatrix}$$

Solve the matrix equation.

9.  $\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} X = \begin{bmatrix} 5 & 1 \\ 2 & 1 \end{bmatrix}$

$$A^{-1} = \frac{1}{4-3} \begin{bmatrix} 2 & -1 \\ -3 & 2 \end{bmatrix} = \begin{bmatrix} 2 & -1 \\ -3 & 2 \end{bmatrix}$$

$$X = \begin{bmatrix} 2 & -1 \\ -3 & 2 \end{bmatrix} \begin{bmatrix} 5 & 1 \\ 2 & 1 \end{bmatrix}$$

$$X = \begin{bmatrix} 8 & 1 \\ -11 & -1 \end{bmatrix}$$

10.  $\begin{bmatrix} 4 & 3 \\ 2 & 2 \end{bmatrix} X = \begin{bmatrix} -2 & 3 \\ -1 & 2 \end{bmatrix}$

$$A^{-1} = \frac{1}{8-6} \begin{bmatrix} 2 & -3 \\ -2 & 4 \end{bmatrix} = \begin{bmatrix} 1 & -1.5 \\ -1 & 2 \end{bmatrix}$$

$$X = \begin{bmatrix} 1 & -1.5 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} -2 & 3 \\ -1 & 2 \end{bmatrix}$$

$$X = \begin{bmatrix} -0.5 & 0 \\ 0 & 1 \end{bmatrix}$$

(optional)

11.  $\begin{bmatrix} 3 & 1 \\ 6 & 3 \end{bmatrix} X = \begin{bmatrix} 1 & 4 & -2 \\ 6 & 0 & -3 \end{bmatrix}$

$$A^{-1} = \frac{1}{9-6} \begin{bmatrix} 3 & -1 \\ -6 & 3 \end{bmatrix} = \begin{bmatrix} 1 & -1/3 \\ -2 & 1 \end{bmatrix}$$

$$X = \begin{bmatrix} 1 & -1/3 \\ -2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 4 & -2 \\ 6 & 0 & -3 \end{bmatrix}$$

$$X = \begin{bmatrix} -1 & 4 & -1 \\ 4 & -8 & 1 \end{bmatrix}$$

(optional)

12.  $\begin{bmatrix} 6 & 2 \\ 5 & 1 \end{bmatrix} X = \begin{bmatrix} 9 & 12 & 6 \\ -4 & 3 & 8 \end{bmatrix}$

$$A^{-1} = \frac{1}{6-10} \begin{bmatrix} 1 & 2 \\ -5 & 6 \end{bmatrix} = \begin{bmatrix} -1/4 & 1/2 \\ 5/4 & -3/2 \end{bmatrix}$$

$$X = \begin{bmatrix} -1/4 & 1/2 \\ 5/4 & -3/2 \end{bmatrix} \begin{bmatrix} 9 & 12 & 6 \\ -4 & 3 & 8 \end{bmatrix}$$

$$X = \begin{bmatrix} -17/4 & -3/2 & 5/2 \\ 69/4 & 21/2 & -9/2 \end{bmatrix}$$

# EXERCISES

Find the product.

$$24. \begin{bmatrix} -1 & -1 \end{bmatrix} \begin{bmatrix} 8 & 2 \\ -6 & -9 \end{bmatrix}$$

$1 \times 2 \quad 2 \times 2$

$$\begin{bmatrix} -2 & 7 \end{bmatrix}$$

$$25. \begin{bmatrix} 11 & 7 \\ 1 & -5 \end{bmatrix} \begin{bmatrix} 0 & -5 \\ 4 & -3 \end{bmatrix}$$

$2 \times 2 \quad 2 \times 2$

$$\begin{bmatrix} 28 & -76 \\ -20 & 10 \end{bmatrix}$$

$$26. \begin{bmatrix} 4 & -1 \\ 1 & 7 \end{bmatrix} \begin{bmatrix} 5 & -2 & 4 \\ 3 & 12 & 6 \end{bmatrix}$$

$2 \times 2 \quad 2 \times 3$

$$\begin{bmatrix} 17 & -20 & 10 \\ 26 & 82 & 46 \end{bmatrix}$$

$$27. \begin{bmatrix} -2 & 5 \\ 0 & 3 \end{bmatrix} \begin{bmatrix} 6 & -3 & 5 \\ 2 & 0 & -1 \end{bmatrix}$$

$2 \times 2 \quad 2 \times 3$

$$\begin{bmatrix} -2 & 6 & -15 \\ 6 & 0 & -3 \end{bmatrix}$$

28. **MANUFACTURING** A company manufactures three models of flat-screen color TVs: a 19 inch model, a 27 inch model, and a 32 inch model. The TVs are shipped to two warehouses. The numbers of units shipped to each warehouse are given in matrix *A*, and the prices of the models are given in matrix *B*. Write a matrix that gives the total value of the TVs in each warehouse.

	Matrix A		
	19 in.	27 in.	32 in.
Warehouse 1	5,000	6,000	8,000
Warehouse 2	4,000	10,000	5,000

$2 \times 3$

	Matrix B
	Price
19 inch	\$109.99
27 inch	\$319.99
32 inch	\$549.99

$3 \times 1$

$$\begin{bmatrix} 5000 & 6000 & 8000 \\ 4000 & 10000 & 5000 \end{bmatrix} \begin{bmatrix} 109.99 \\ 319.99 \\ 549.99 \end{bmatrix} = \begin{bmatrix} 6,869,810 \\ 6,389,810 \end{bmatrix}$$

Warehouse 1	6,869,810
Warehouse 2	6,389,810